

What is claimed is:

1 1. A method for detecting dropped packets in a network including a packet switched network, the  
2 method comprising:

3 establishing a telephonic connection between a first network location and a second  
4 network location;

5 transmitting at least one set of N waveforms from the first network location, each  
6 transmitted waveform including a waveform characteristic operative to assign  
7 a predetermined value relative to other waveforms in the at least one set, such  
8 that a predetermined sequence of values are assigned to packets carrying the N  
9 transmitted waveforms;

10 receiving at least one telephonic signal at the second network location via the  
11 communications channel;

12 processing the at least one telephonic signal to obtain a received sequence of values;  
13 and

14 comparing the received sequence of values to the predetermined sequence of  
15 transmitted values to detect dropped packets without having access to packet  
16 switched network control data.

1 2. The method of claim 1, wherein the representative waveform characteristic is a  
2 peak power level.

1 3. The method of claim 1, wherein the representative waveform characteristic is an  
2 average power level.

1 4. The method of claim 1, wherein each waveform in the set of N waveforms includes  
2 a representative waveform characteristic corresponding to one of N peak power levels.

1           5. The method of claim 4, wherein each of N peak power levels corresponds to a value  
2 between 0 and N, such that the predetermined sequence of values is 1, 2,..., N.

1           6. The method of claim 1, wherein the transmitted set of N waveforms comprise a  
2 single waveform having a monotonically increasing or decreasing power level.

1           7. The method of claim 1, wherein each waveform includes a first segment and a  
2 second segment.

1           8. The method of claim 7, wherein the second segment includes the representative  
2 waveform characteristic.

1           9. The method of claim 1, wherein each predetermined value includes a predetermined  
2 bit pattern.

1           10. The method of claim 1, where in the representative waveform characteristic is a  
2 waveform corresponding to a CELP symbol.

1           11. The method of claim 1, wherein the representative waveform characteristic  
2 includes a frequency of the waveform.

1           12. The method of claim 1, wherein the representative waveform characteristic  
2 includes a number of phase changes present in a segment of the waveform.

1           13. The method of claim 1, wherein the representative waveform characteristic  
2 includes a semantically encoded waveform.

1 14. The method of claim 1, wherein the step of processing includes the step of  
2 dividing the at least one telephonic signal into received waveform sections having a duration  
3 substantially identical to the transmitted waveform.

1 15. The method of claim 14, wherein the step of processing further comprises:  
2 analyzing each received waveform section to extract a received waveform  
3 characteristic;  
4 assigning each received waveform section a received value based on the received  
5 waveform characteristic; and  
6 generating a sequence of received values based on the step of assigning to obtain the  
7 received sequence of values.

1 16. The method of claim 15, wherein a deviation between the predetermined sequence  
2 of values and the sequence of section values corresponds to a dropped packet.

1 17. The method of claim 16, wherein a deviation between the predetermined sequence  
2 of values and the sequence of section values includes a missing section value, the missing  
3 section value corresponding to a dropped packet.

1 18. The method of claim 16, wherein a deviation between the predetermined sequence  
2 of values and the sequence of section values includes a repetition of at least one section value,  
3 the repetition corresponding to a dropped packet.

1 19. The method of claim 16, wherein a deviation between the predetermined sequence  
2 of values and the sequence of section values includes a repetition of at least one section value,  
3 the repetition indicating a packet loss concealment routine operating in the packet switched  
4 network.

20. The method of claim 14, wherein the step of processing further comprises:  
 comparing each received waveform section to a plurality of CELP waveform patterns;  
 assigning a symbol number to the received waveform section based on the step of  
 comparing each received waveform section; and  
 generating a sequence of received values using the symbol numbers of the received  
 waveform sections, to thereby obtain the received sequence of values.

21. The method of claim 14, wherein the step of processing further comprises:  
 comparing each received waveform section to a plurality of semantically encoded  
 waveform patterns;  
 assigning a bit-pattern to the received waveform section based on the step of  
 comparing each received waveform section; and  
 generating a sequence of section values using the bit-pattern of the received waveform  
 sections, to thereby obtain the received sequence of values.

22. A system for detecting dropped packets in a telecommunications network  
 including a packet switched network, the system comprising:  
 a transmission unit configured to send at least one set of N waveforms over the  
 telecommunications network, each transmitted waveform including a  
 waveform characteristic operative to assign a predetermined value relative to  
 other waveforms in the at least one set, such that a predetermined sequence of  
 values are assigned to packets carrying the N transmitted waveforms; and  
 a receiver unit operative to receive a telephonic signal from the telecommunications  
 network, the receiver also being configured to derive a received sequence of  
 values from the telephonic signal, and compare the received sequence of  
 values to the predetermined sequence of values to detect dropped packets,  
 without having access to packet switched network transmission control data.

1           23. The system of claim 22, wherein the transmission unit further comprises:  
2           a computer-readable medium for storing data representing the at least one set of N  
3           waveforms;  
4           a processor coupled to the computer readable medium, the processor being  
5           programmed to retrieve the data from the computer readable medium; and  
6           a codec device for converting the data into a signal suitable for transmission over the  
7           telecommunications network.

1           24. The system of claim 22, wherein the receiver unit further comprises:  
2           a computer-readable medium;  
3           a codec device for converting a received telephonic signal into digitized data suitable  
4           for storing in a file in the computer-readable medium; and  
5           a processor programmed to,  
6           divide the digitized data in the file into received waveform sections,  
7           analyze each received waveform section to extract a received waveform  
8           characteristic,  
9           assign each received waveform section a received value based on the received  
10          waveform characteristic, and  
11          generate a sequence of received values based on the step of assigning, to thereby  
12          obtain the received sequence of values.

1           25. The method of claim 24, wherein a deviation between the predetermined sequence  
2           of values and the sequence of section values corresponds to a dropped packet.

1           26. The method of claim 25, wherein a deviation between the predetermined sequence  
2           of values and the sequence of section values includes a missing section value, the missing  
3           section value corresponding to a dropped packet.

1           27. The method of claim 24, wherein a deviation between the predetermined sequence  
2 of values and the sequence of section values includes a repetition of at least one section value,  
3 the repetition corresponding to a dropped packet.

1           28. The method of claim 24, wherein a deviation between the predetermined sequence  
2 of values and the sequence of section values includes a repetition of at least one section value,  
3 the repetition indicating a packet loss concealment routine operating in the packet switched  
4 network.

1           29. The system of claim 24, wherein the processor is further configured to:  
2 compare each received waveform section to a plurality of CELP waveform patterns;  
3 assign a symbol number to the received waveform section based on the step of  
4 comparing each received waveform section; and  
5 generate a sequence of section values using the symbol numbers of the received  
6 waveform sections.

1           30. The system of claim 29, wherein a section waveform characteristic is a waveform  
2 corresponding to a CELP symbol.

1           31. The system of claim 24, wherein the signal processor is further configured to:  
2 compare each received waveform section to a plurality of semantically encoded  
3 waveform patterns;  
4 assign a bit-pattern to the received waveform section based on the step of comparing  
5 each received waveform section; and  
6 generate a sequence of section values using the bit-pattern of the received waveform  
7 sections.

1 32. The system of claim 31, wherein a section waveform characteristic is a  
2 semantically encoded waveform.

1 33. A computer-readable medium having computer-executable instructions for  
2 performing a method, the method comprising:  
3 transmitting at least one set of N waveforms from the first network location, each  
4 transmitted waveform including a waveform characteristic operative to assign  
5 a predetermined value relative to other waveforms in the at least one set, such  
6 that a predetermined sequence of values are assigned to packets carrying the N  
7 transmitted waveforms;  
8 receiving at least one telephonic signal at the second network location via the  
9 communications channel;  
10 processing the at least one telephonic signal to obtain a received sequence of values;  
11 and  
12 comparing the received sequence of values to the predetermined sequence of  
13 transmitted values to detect dropped packets without having access to packet  
14 switched network control data.

1 34. A computer-readable medium having computer-executable instructions for  
2 performing a method, the method comprising:  
3 establishing a telephonic connection between a first network location and a second  
4 network location; and  
5 transmitting at least one set of N waveforms from the first network location, each  
6 transmitted waveform including a waveform characteristic operative to assign  
7 a predetermined value relative to other waveforms in the at least one set, such  
8 that a predetermined sequence of values are assigned to packets carrying the N  
9 transmitted waveforms.

1        35. A computer-readable medium having computer-executable instructions for  
2 performing a method, the method comprising:  
3        receiving at least one telephonic signal at the second network location via the  
4        communications channel;  
5        processing the at least one telephonic signal to obtain a received sequence of values;  
6        and  
7        comparing the received sequence of values to the predetermined sequence of  
8        transmitted values to detect dropped packets without having access to packet  
9        switched network control data.

1        36. The method of claim 35, wherein the step of processing further comprises:  
2        analyzing each received waveform section to extract a received waveform  
3        characteristic;  
4        assigning each received waveform section a received value based on the received  
5        waveform characteristic; and  
6        generating a sequence of received values based on the step of assigning to obtain the  
7        received sequence of values.

1        37. The method of claim 35, wherein the step of processing further comprises:  
2        comparing each received waveform section to a plurality of CELP waveform patterns;  
3        assigning a symbol number to the received waveform section based on the step of  
4        comparing each received waveform section; and  
5        generating a sequence of received values using the symbol numbers of the received  
6        waveform sections, to thereby obtain the received sequence of values.

1        38. The method of claim 35, wherein the step of processing further comprises:  
2        comparing each received waveform section to a plurality of semantically encoded  
3        waveform patterns;



- 4 assigning a bit-pattern to the received waveform section based on the step of
- 5 comparing each received waveform section; and
- 6 generating a sequence of section values using the bit-pattern of the received waveform
- 7 sections, to thereby obtain the received sequence of values.